Abstract Form

42nd National Symposium *of* the
AMERICAN VACUUM SOCIETY

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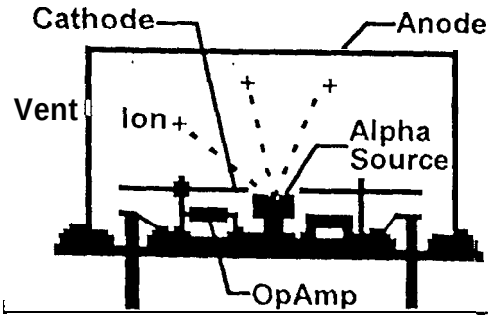
bold Title and underline Speaker's name; use 12pt. type or larger.

Alpha-Particle Gas Pressure Gauge, M. G. Buehler, L. D. Bell, and M. H. Hecht, Jet Propulsion Laboratory, Pasadena, CA 91109

This paper describes preliminary results obtained on a novel gas pressure gauge that operates between 0.1 and 1000 mb. The gauge, depicted in the figure, uses a 1-μCi alpha particle source to ionize the gas in a small chamber with an electric field imposed between anode and cathode electrodes that drives positive ions to the cathode where they are collected electronically. Room temperature results obtained for nitrogen indicate that the ion current is proportional to pressure over the 0.1 to 1000 mb pressure range. The ion current for a 1-μCi alpha source at 1000 mb is about 10 pA and at 1 mb is about 10 fA. The fA currents are easily measured using commercially available operational amplifiers provided proper attention is given to noise and leakage currents. The motivation for this effort is the construction of a pressure gauge for measuring Martian pressures between 1 and 20 mb that is small, light weight, low power, and robust enough to survive a hard landing. Initial results from three different prototypes indicate that a reasonable design goal for the gauge is a volume of 2 cm^3, weight of 10 g, operating power of 1 mW, and anode voltage of < 5 V, and accuracy of < 1 percent.



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Surface Science, Inc.
110 Pioneer Way, Suite D
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2. Prof. Glenn F. Knoll
Nuclear Engineering
The University of Michigan
Ann Arbor, Michigan

3. Dr. Alexander D. Khazan
No. 8 Arrow Lane
Amherst
New Hampshire 03031

Name, Address, Phone and Fax Number of Corresponding Author:

Martin Buehler 300-329
Jet Propulsion Lab
4800 Oak Grove Dr.
Pasadena. CA 91109

Phone: 818-790-4679
FAX: 818-393-4820
Email: MARTIN.G. BUEHLER @JPL.NASA.GOV